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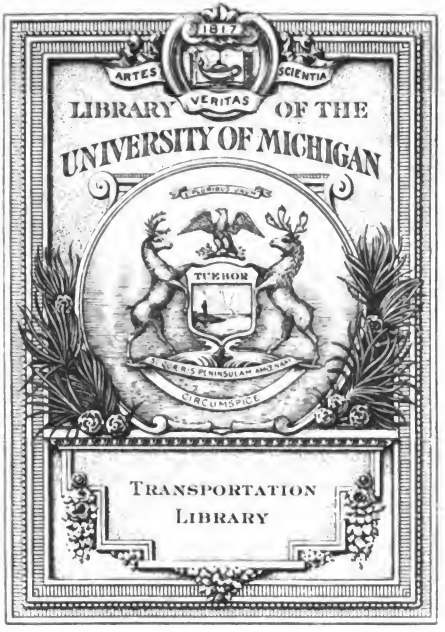

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27th Congress, 2d Session. Doc. No. 189. Ho. of Reps.

RUMSEY'S STEAM ENGINE.

April 15, 1842.

Mr. Underwood, of Kentucky, submitted an original printed pamphlet to the House of Representatives of the United States, of which the following is a copy, and moved that it be printed for the use of the members; which motion was agreed to unanimously.

This reprint is as near a fac simile of the original pamphlet as it is possible now to make it.

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A

SHORT

TREATISE

ON THE APPLICATION OF

STEAM,

WHEREBY IS CLEARLY SHEWN,

FROM

ACTUAL EXPERIMENTS,

THAT

STEAM

MAY BE APPLIED TO PROPEL

BOATS OR *VESSELS*

OF ANY BURTHEN AGAINST RAPID CURRENTS WITH GREAT VELOCITY.

GREAT VELOCITY.

The same principles are also introduced with Effect, by a Machine of a simple and cheap Construction, for the purpose of raising Water sufficient for the working of

GRIST OR SAW MILLS.

AND *for* WATERING MEADOWS *and* OTHER AGRICULTURAL PURPOSES.

By JAMES RUMSEY,

OF BERKELEY COUNTY, *Virginia.*

PHILADELPHIA,

PRINTED BY JOSEPH JAMES: CHESNUT-STREET.

M,DCC,LXXXVIII.

1788

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ADVERTISEMENT.

THE following pages are taken from a pamphlet published in Virginia, to prove the author's prior right of applying steam, to propel boats &c. as well as to establish the principles on which he has done it, a few copies were then thought sufficient for that purpose, but as Mr. Fitch intends to answer the pamphlet, it is therefore necessary to re-publish as much of it as respects Mr. Fitch, which is done with no other variation, from the original, than to correct a few of the errors and mistakes that were introduced into the first publication, the reason for which it was done, (as the author at that time could not attend the press) and was circulated with an apology annexed to the postcript, for the imperfection of the impression; of these corrections, perhaps, Mr. Fitch may take some notice, if he should, such part of the old pamphlet shall be reprinted (verbatim) to convince the Public that the subject has not been varied; but a little better explained. The sophistry in Mr. Fitch's reply (should it contain what he informs me it does) is evidently calculated to make impressions, unfavorable of me, on the public mind, and to wound the reputation of several respectable characters, I must therefore beg the Public's indulgence, to suspend their opinion for a few weeks, when I shall have it in my power to lay before them such an additional statement of facts, supported by such respectable testimony, as will incontestibly prove the unjustifiable steps Mr. Fitch has taken, to deprive the author of his discoveries, and to injure the reputation of sundry gentlemen.

No. 19 is added to this publication, it is part of a letter wrote by the editor to his Excellency General Washington, dated the tenth of March 1785 which will shew that the editor had fixed on a method of applying steam to propel a boat, before Mr. Fitch knew (from his own account of the matter) that steam had ever been made use of for any purpose whatever; how then is it possible he should have the prior right to this discovery? if it is asked who made the first

* * * * * * * * * *

* * I endeavored to keep them secret until perfected? * *

* * never suffer it. I therefore with the greatest confidence look up to my countrymen for their support, according to the merits of my cause, and have the honor of subscribing myself their

most devoted humble servant

JAMES RUMSEY.

Philadelphia, May 7, 1788.

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1-23-40

A SHORT TREATISE ON *THE APPLICATION* OF STEAM, &c.

To the PUBLIC.

THOSE who have had the good fortune to discover a new machine, or to make any material improvements on such as have been already discovered, must lay their account to encounter innumerable difficulties; they must arm themselves with patience to abide disappointments; to correct a thousand imperfections (which the trying hand of experience alone can point out) to endure the smarting shafts of wit, and, what is perhaps more intolerable than all the rest put together (on the least failure of any experiments) to bear up against the heavy abuse and bitter scoffs of ill-natured ignorance. These never fail to represent the undertaker as an imposter, and his motives the most knavish: Happy for him if he escape with so gentle an appelative as that of a madman.

This is the fate of the unlucky projector, even in the cities of Europe, where every material is at his command, and every artificer at his service. A candid public will then consider my situation, thrown by hard fate beyond the mountains, and deprived of every advantage which, that grand mover, money, produces, they will easily perceive how my difficulties have been multiplied, which is the only reason of my not exhibiting my long promised BOAT before this; and which I hope will be a sufficient apology. Even now, these difficulties render my machinery very incomplete; but Mr. Fitch's endeavoring to procure pa-

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tents for his boat, by uncandidly representing, to the different Assemblies, that my boat had nothing to do with steam, although be had been informed that I was before him, both in the idea and the application of steam; and he had actually procured an exclusive right from two respectable Assemblies, who had granted me the same in the year 1784, before I was aware what he was about, such treatment obliged me, circumstanced as I was, to make an experiment, in order to secure to myself my own discovery, by shewing my principles, as Mr. Fitch's conduct gave me reason to fear that he would adopt my plan, as soon as he found his abortive. And my machine, with all its misfortunes upon its head, is abundantly sufficient to prove my position; which was, "that a boat might be so constructed, as to be propelled, through the water, at the rate of ten miles in an hour, by the force of steam; and that the machinery employed for that purpose, might be so simple and cheap, as to reduce the price of freight at least, one half in common navigation; likewise, that it might be forced, by the same machinery, with considerable velocity, against the constant stream of long and rapid rivers.

Such a machine I promised to prepare, and such a boat to exhibit; this I have now so far performed, in the presence of so many witnesses, and to the satisfaction of so many disinterested gentlemen, as to convince the unprejudiced, and deprive even the sceptic of his doubt.

If the reader will be pleased to turn to the annexed certificates, No. 1, 2, 3, he will be convinced that on Monday, the 3d day of December last, my boat was propelled with near half her burthen on board, against the current of Potowmack river, at the rate of three miles an hour, notwithstanding the bad order the machinery was then in; and by the certificates, No. 4 and 5, on the eleventh of the same month, by what little repairs I could give it, in a country where conveniences were not to be had, her progress against the same stream was encreased to four miles in an hour, with more than half her burthen on board. What additions may not be expected, if I am enabled, by the generosity of the different Assemblies to perfect my plan?

In the month of September, 1784, I exhibited the model of a boat before his excellency General Washington, at

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Bath, Berkeley county, calculated for stemming the current of rapid rivers only, constructed on principles very different from my present one. Satisfied with the experiment of her making way against a rapid stream, by the force of the said stream, the General was pleased to give me a most ample certificate of her efficacy. And though the great utility of such a boat will appear, if ever a fair trial should be given it; and at the time of that exhibition it was fully my intention to complete this boat, yet, in the course of that fall and winter, I made such progress in the improvement of some steam engines, which I had long conceived would become of the greatest consequence in navigation, that I postponed it till experiments should determine whether the steam engines could be reduced to such simplicity and cheapness, as to make them of public benefit; not being certain of this, though perfectly convinced of the power, was my only reason for not mentioning this scheme also to the General, at that exhibition; and I flattered myself this invention, if it answered my expectation, (the truth whereof experiments have now established) would render my labors more extensively useful, by being equally applicable to small boats or vessels of the largest size, to shallow and rapid rivers or the deepest and roughest seas, (indeed, in large vessels, compared with the value of freight, the expence of the machinery proportionably decreases) I applied myself with unremitted attention to perfect my steam engines, and made such progress in that fall and the ensuing spring, that my experiments assured me the perfection of such a machine was within my reach. I therefore wrote to General Washington, the 10th of March, 1785 (No. 19) that I intended applying both powers to a boat built after the model of the one he saw at Bath; but as I was under many disadvantages, arising from a remote situation, and could gain truth only by successive experiments, incredible delays were produced; and though my distresses were greatly increased thereby, I bore the pelting of ignorance and ill-nature with all resignation, until I was informed some dark assassins had endeavored to wound the reputation of his excellency, and the other gentlemen who saw my exhibition at Bath, for giving me a certificate. The reflections upon these worthy gentlemen gave me inexpressible uneasiness, and I should certainly have quitted my steam engines, though in great forwardness, and have produced the boat for which I obtained the certifi-

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cate for their justification and my own, although I had actually made several experiments on a boat with steam, but Mr. Fitch came out at this critical minute with his steam boat, asserting, that "he was the first inventor of steam, and that I had gotten what small knowledge I had from him, but that I had not the essentials (vide No. 18.) There was no time to lose, for had I delayed a moment, all my time which was several years with the closest attention, all my expences, which had been very great, to the most of all I had, would have been irrecoverably lost; besides, had I exhibited my first boat, it would have been construed into an acknowledgement of Mr. Fitch's assertion, by producing a boat with which steam had nothing to do. These considerations compelled me to pursue the perfecting my steam engines with encreased ardor, and happy am I to inform the public, they are now so far completed, as to manifest their valuable purposes for the navigations before mentioned, applicable to vessels of all dimensions, equal to forcing boats by the assistance of poles, worked by the same machine, against any rapid the same boats can with safety come down; and for raising water, for grist or saw mills, watering meadows, or purposes of agriculture, cheaper than races can be dug of any considerable distance, or dams made, No. 9 whilst Mr. Fitch was praying the different Assemblies for four years longer to perfect his machine. The difference there is in weight, machinery and expences, between his steam engine and mine, is enormous (to be satisfied in this particular, the reader will be pleased to turn to the annexed papers, No. 6 and 7.

Lest it should be suggested that I have borrowed my principles from Mr. Fitch, (though I believe the fact to be exactly the reverse) I have been at the pains to prove incontestibly that my idea of a boat to be worked by steam, was a considerable time before his, and that it had been mentioned at Kentuckey (from whence, I am told, he brought his) by a gentleman to whom I communicated it, previous to his departure for that country. For the former, the reader will be pleased to refer to the annexed affidavits, No. 8, 10, 11, 12, and to a paragraph from his excellency General Washington's letter, in answer to mine, of the tenth of March, 1785, No. 13, and to Governor Johnson's letter, No. 14, for the latter (that is my inten-

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tions being mentioned at Kentuckey,) to Capt. Michael Bedinger's affidavit, No. 15.

I have been unadvoidably led to mention Mr. Fitch for my own justification, and to prove my prior right to the application of steam for propelling boats, and I should have said no more, but let experience determine whose principles are soundest, had not Mr. Fitch, equally void of decency and truth, asserted "I got what small knowledge I have of steam boats from him." No. 18. By the respectable testimony of his excellency General Washington, No. 13; by Governor Johnson, No. 14, and by certificates and affidavits from many other gentlemen, hereunto annexed, I prove my idea was nearly matured, before steam had ever entered his imagination, by his own confession to Governor Johnson, No. 14. Nor was my priority unknown to Mr. Fitch, for General Washington informed him, "though he thought himself not at liberty to disclose my principles, yet he would assure him his thought was not original, and that I had mentioned the application of steam to him before," (No. 14) and therefore he declined giving Mr. Fitch an introductory letter to the Assembly of Virginia. What dependance can the public put in the promises of a man, who has knowingly and unprovokedly (for I never saw Mr. Fitch) treated an individual so unworthily. Now I can, with truth, assure the public, that Mr. Fitch's boat so loaded with machinery, complexity and expense, (granting his machine all the properties he ascribed to it in his publication) can never be useful; as his machine, by his own publications, allowing for frictions and the necessary slipping of his paddles through the water, will not propel his boat, at the rate of more than three miles in an hour, where no current opposes.

If Mr. Fitch did get his first idea of a steam-boat from what Captain Bedinger said respecting mine, at Kentuckey (which circumstances leave little room to doubt) and thought himself justified in making an application of it to his own advantage, as it was not delivered to him in confidence, yet surely nothing can be said in his defence, for endeavouring to rob the first inventor of his right, and, by changing persons with him, attempting thereby to transfer the odium of plagiarism from himself to the real proprietor.

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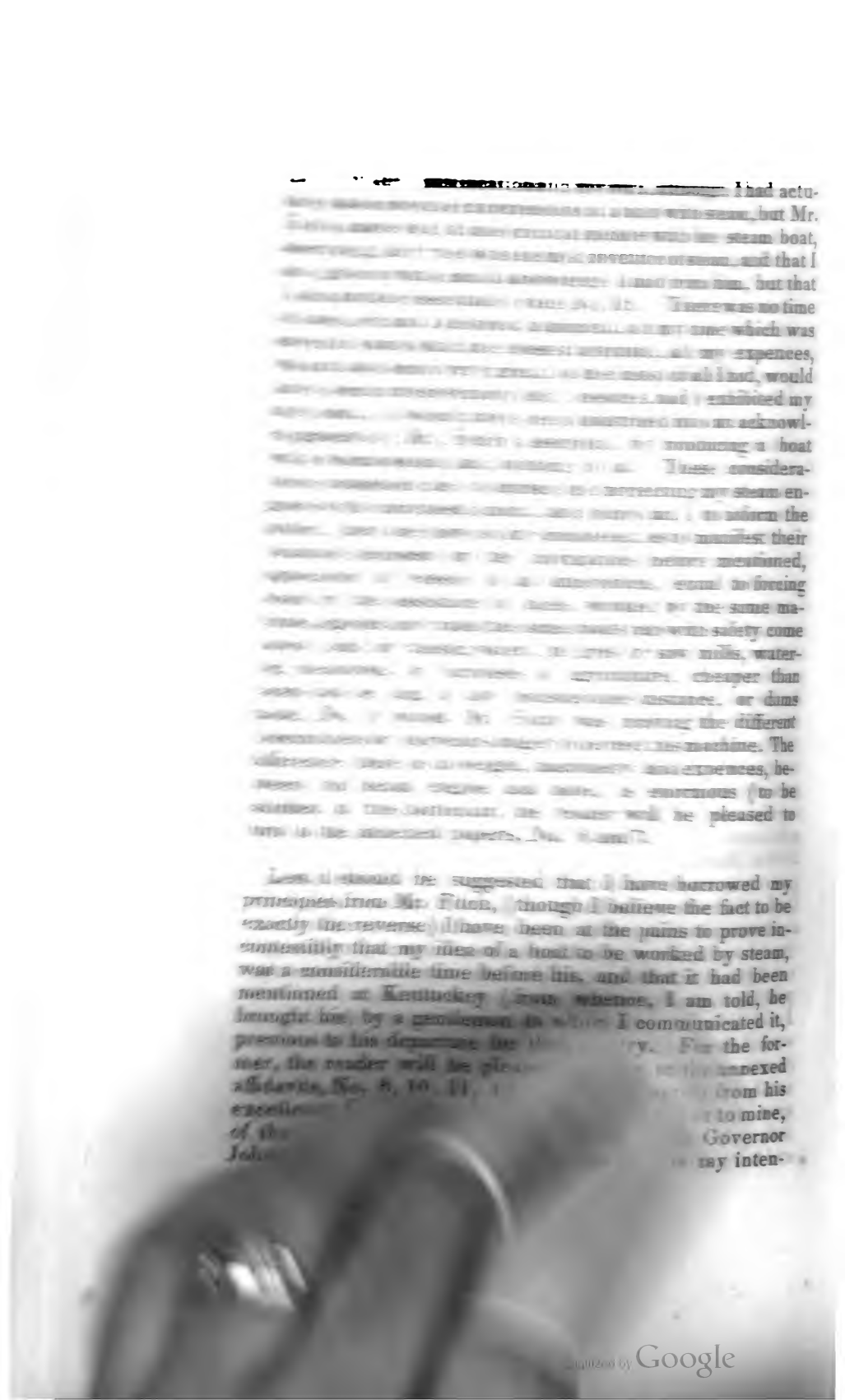

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EXPLANATION

OF THE

STEAM-BOAT.

The following explanation will give a general idea of the principles by which steam acts on my boat; accurate calculations of the particular powers, seem not necessary here to be given.

IN the bottom of the boat, on the kelson, there is a trunk, the after end of which is open, and terminates at the stern post; the other end is closed, and the whole trunk, according to its dimensions, occupies about three-fourth parts of the length of the boat. On the closed end of the trunk stands a cylinder two and a half feet long, from this cylinder there is a communication by a tube to the river or water under the boat, on the top of this tube and within the cylinder, there is a valve to admit the water from the river into the cylinder, and it likewise prevents it from returning again the same way. There is another communication which lets water pass freely from the cylinder to the trunk, through which it is discharged by the stern; on the top of this cylinder there stands another of the same length, which is fixed to the under one by screws; in each of these cylinders there is a piston which moves up and down with very little friction; these pistons are connected together by a smooth bolt, passing through the bottom of the upper cylinder; the lower cylinder acts as a pump, which draws water from the river through the tube of the valve, before described. The upper cylinder acts as a steam-engine, and receives its steam from a boiler under its piston, which is then carried up to the top of the cylinder by the steam (at the same time, the piston of the lower cylinder is brought up to its top, from its connection with the upper piston, by the aforesaid bolt,) they then shut the communication from the boiler, and open another to discharge the steam for condensation; by this means the atmosphere acts upon the piston of the upper cylinder, and its force is conveyed to the piston in the lower cylinder, by the aforesaid connecting bolt, which forces the water,

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then in the lower cylinder, through the trunk, with considerable velocity; the reaction of which, on the other end of the trunk, is the power that propels the boat forward.

To prove the use of the TRUNK.

It is well known that a heavy body falling near the earth will pass through a space of about fifteen feet in the first second of time; if the same body was acted upon in a horizontal direction, by an impulse equal to its weight, it would move in that direction the same distance in an equal time; it follows then, that the water in the trunk, will have the effect proportionable to its weight, of retarding the water from being discharged from the cylinder in too short a time.

Near the cylinder, on the top of the trunk, there is a valve to admit air, which follows the water that is then in motion, and gives time for the water to rise gradually into the trunk through valves, at its bottom, for that purpose; this water has but little motion with respect to the boat and is therefore capable of resisting the next stroke of the engine.

Thus I have laid the principles of my boat before the public, and can assure them, by the wonderful force of steam, issuing in incredible quantities, from an entirely new constructed boiler, no doubt remains but all the advantages which I before-mentioned, both with respect to navigation and the raising of water, will be produced. The one I have actually proved, by a loaded boat being propelled against a stream, with the velocity of four miles in an hour, in the presence and to the great satisfaction of numerous spectators, and the other by models now ready to be produced, which admit not of contradiction.

If the public think these inventions, which must be productive of the greatest usefulness, worthy their patronage, I cannot fear but an exclusive right will be granted me, by the different Assemblies of the United States, for a given number of years, which they may think right, for the

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erecting of these machines of my own invention, to compensate me for the trouble, for the time, for the expence and for the fatigue which they have cost me.

If a committee of experimental philosophers should be appointed in each state, to examine me, it would give me infinite pleasure to attend, and convince them of the practicability of all I have proposed, of the simplicity of my machines, and of the smallness of their expence.

I am, with the greatest respect,

the Public's most devoted,

and obedient humble servant,

JAMES RUMSEY.

Berkeley County, Virginia, January 1, 1788.

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PROOFS, &c.

BERKELEY COUNTY, ff,

WE, the subscribers, Justices of the Peace for the county aforesaid, do certify, that the annexed affidavits, certificates and extracts of letters have been examined by us, and are true copies from the originals.

JOHN KEARSLEY,
CATO MOORE.

December 28, 1787.

VIRGINIA, BERKELEY COUNTY, ff.

I, MOSES HUNTER, Clerk of the said county, do hereby certify, that John Kearsley and Cato Moore, Gentlemen, who have subscribed the above certificate, were at that time, and still are Justices of the Peace, for said county, and that all due faith and credit is and ought to be given to all probates by them so signed, as well in justice Courts as thereout. In testimony whereof, I have hereunto set my hand, and affixed the seal of the said county, this 29th day of December, 1787.

[L. S.]

MOSES HUNTER.

CERTIFICATES, &c.

Berkeley County, Virginia, ff. *(No. 1.)*

ON Monday, December 3, 1787, I was requested to see an experiment on Potowmack river made by Mr. JAMES RUMSEY'S Steam Boat, and had no small pleasure to see her get on her way, with near half her burthen on board, and move against the current at the rate of three miles per hour, by the force of steam, without any external application whatever. I am well informed, and verily believe, that the machine at present is very imperfect, and by no means capable of performing what it would do if completed: I have not the least doubt but it may be brought into common and beneficial use, and be of advantage to all navigations, as the machine is simple, light

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and cheap, and will be exceeding durable, and does not occupy a space in the boat of more than four feet by two and a half.

HORATIO GATES.
Late Major General in the Continental Army.

Berkeley County, Virginia, ff. *(No. 2.)*

On Monday, December 3, 1787, I was requested to see an experiment on Potowmack river, made by Mr. JAMES RUMSEY's Steam Boat, and had no small pleasure to see her get under way with near half her burthen on board, and move against the current at the rate of three miles per hour, by the force of steam, without any external application whatever: I am well informed, and do verily believe, that the machine at present is very imperfect, and by no means capable of performing what it would do if completed: I have not the least doubt but it may be brought into common and beneficial use, and be of great advantage to all navigations, as the machine is simple, light and cheap, and will be exceeding durable, and does not occupy a space in the boat of more than four feet by two and a half.

ROBERT STUBBS,
Teacher of the Academy in Shepherd's-Town.

Berkeley, County, Virginia, ff.

The Rev. Robert Stubbs, Gent. Teacher of the Academy at Shepherd's-Town, acknowledged before us, magistrates for said county, that he did subscribe the above writing. Given under our hands, 14th Dec. 1787.

CATO MOORE,
JOHN KEARSLEY.

Berkeley County, Virginia, ff. *(No. 3.)*

Being requested to see an experiment made by Mr. JAMES RUMSEY's Steam Boat, on Potowmack river, on Monday, the 3d of December, 1787, it was with great pleasure that we saw her get under way, with two tons on board, exclusive of her machinery, and move against

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the current at the rate of three miles in an hour, by the force of steam, without any external application whatever: We are well informed, and believe, that the machinery at present is very imperfect, and by no means capable of performing what it would do if completed. We are persuaded it may be brought into common and beneficial use, and be of great advantage to all navigations, as the machine is simple, light and cheap, and does not occupy a space in the boat of more than four feet by two feet and a half.

ABRAHAM SHEPHERD, JOHN MORROW,
WILLIAM BRICE, HENRY BEDINGER,
DAVID GRAY, THOMAS WHITE,
CHARLES MORROW,

Berkeley County, Virginia, ff.

Personally appeared before us, John Kearsley and Cato Moore, Justices of the Peace for the county aforesaid, the sundry subscribers to the above certificate, who are all gentlemen of reputation, and by us supposed to be competent judges of what they have set forth, and they acknowledge the same to be their voluntary act, we were likewise present at the exhibition, and certify the truth of the above certificate. Given under our hands this 13th of December, 1787.

JOHN KEARSLEY,
CATO MOORE.

Berkeley County, Virginia, ff. No. 4.

Being requested to attend an experiment made by Mr. JAMES RUMSEY with his Steam Boat, on Potowmack river, on Tuesday the 11th day of Dec. 1787, it was with great pleasure we saw her advance against the current, with about three tons on board, at the rate of four miles an hour, without an oar, or any thing but the force of steam, either to generate or assist the motion; if the machinery had been in good order, we have reason to believe, she would have gone much faster, and as the ma-

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chine is light and cheap, we are all persuaded that it may be of great advantage in navigation.

MOSES HOGE, JOHN MARK, JOHN MORROW,
CORNEL WYNHOOP, BENONI SWEARINGEN, JOS. SWEARINGEN.

N. B. We think the machinery does not weigh more than six or seven hundred weight, and is not included in the burthen mentioned above.

Berkeley County, Virginia. ff.

Personally appeared before us, two of the Justices of the Peace for the county aforesaid, the sundry subscribers to the above certificate, who are all gentlemen of reputation, and by us supposed to be competent judges of what they have set forth; and they acknowledge the same to be their voluntary act.

December the 13th, 1787.

CATO MOORE,
JOHN KEARSLEY,

Berkeley County, Virginia, ff, (No. 5.)

Being requested to see an experiment made by Mr. JAMES RUMSEY's Steam Boat, on Potowmack river, on Tuesday the 11th of December, 1787, it was with great pleasure we saw her get under way with upwards of three tons on board, and move against the current at the rate of four miles an hour, by the force of steam, without any external application whatever: We are well informed, and believe, that the machinery at present is very imperfect, and by no means capable of performing what it would do, if completed; we are persuaded that it may be brought into common and beneficial use, and be of great advantage to navigation, as the machine is simple, light and cheap, and does not occupy a space of more than four feet by two and a half.

CHARLES MORROW, ROBERT STUBBS, HENRY BEDINGER,
THOMAS WHITE, ABRAHAM SHEPHERD.

Berkeley, County, Virginia.

Personally appeared before us, two of the Justices of the Peace for the county aforesaid, the sundry subscribers to the above certificate, who are all gentlemen of reputation,

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and by us supposed to be competent judges of what they set forth, and they acknowledge the same to be their voluntary act. Given under our hands, this 14th December, 1787.

CATO MOORE,
JOHN KEARSLEY.

Berkeley County Virginia. ff. *(No. 6.)*

The Affidavit of William Askew, of Berkeley County, and state of Virginia, sheweth, that he was in the city of Philadelphia, as well as he remembers, in the month of September last, when he had an opportunity of seeing what is called the Steam Boat, said to be constructed by Mr. Fitch; on taking a view of which boat, (and from the information of a gentleman, who appeared to be concerned in the said machine) this deponent is of opinion, the boiler will hold five hundred gallons of water. From what he was informed, from the gentleman aforesaid, and from his own view, his opinion is, that the machinery of Mr. Fitch's boat, on a moderate calculation, will, on its present construction, weigh seven tons, exclusive of the quantity of wood necessary for the boiler. This deponent further saith, that he verily believes the machinery of Mr. Fitch's steam boat must necessarily cost three hundred pounds.—This deponent hath lately seen the steam boat constructed by Mr. James Rumsey, of Berkeley county, Virginia, and believes, from good information, as well as his own opinion on examination, that Mr. Rumsey's steam machinery will not, on its present construction, weigh more than eight hundred pounds, and may be worked with a very inconsiderable quantity of wood or coals, perhaps not more coals in twelve hours than four bushels; and that Mr. Rumsey's boiler need have no more water, at one time, than one pint, or perhaps not so much, to keep the machinery in sufficient motion to stem the stream of a river, sufficiently fast to be safe with a cargo of goods. This deponent is well convinced that the whole of Mr. Rumsey's machinery may be made for twenty pounds, nor will it occupy more room in a boat than four barrels of flour.

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Berkeley County, Virginia.

This day William Askew came before me, one of the Justices of the Peace for the county aforesaid, and made oath that the above testimony, as far as came within his own knowledge, is true, and so he believes is the information he received from others. Sworn before me, December 8th, 1786.

JAMES WILSON.

Berkeley County, Virginia. ff. *(No. 7.)*

To whom it may concern.

On application of Mr. James Rumsey and sundry other gentlemen, requesting my opinion, whether Mr. Fitch's or Mr. Rumsey's steam boat, agreeable to the present different plans of working each boat, would be of the greatest public utility; I have, at their importunities, consented, (as far as my knowledge of the matter will admit) to give my opinion, without reserve, to the best of my judgement; and, as I have seen both Mr. Fitch's and Mr. Rumsey's steam boats, with the machinery, or at least so much thereof as could be observed, by a common examination, I presume that Mr. Rumsey's plan is much the more eligible, simple and practicable. Mr. Fitch's machinery appears bulky, weighty, and complicated, leaving little room in the boat in which I saw it, for loading. The weight of the whole apparatus I suppose to be five tons—whereas the whole of Mr. Rumsey's machinery, at the time of exhibiting publicly, with every apparatus complete, could not weigh more than five hundred pounds.

It is obvious, therefore, that a machine weighing one twentieth only, and of small size, comparative with the other, and by many degrees less complicated, must prove of the greatest public utility, and will be practised in preference to the other.

I do therefore give it as my opinion, that Mr. Rumsey's plan is to be preferred to Mr. Fitch's. Given under my hand, at Shepherds-Town, this 6th day of December, 1787.

HENRY BEDINGER.

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Berkeley County, Virginia. ff.

Captain Henry Bedinger acknowledged before us, magistrates for the said county, that he subscribed the above writing. Given under our hands, this 14th day of December 1787.

CATO MOORE.
JOHN KEARSLEY.

Berkeley County, Virginia.

We, the subscribers, have been long acquainted with the within mentioned Captain Henry Bedinger, and have ever found him a worthy gentleman.

HORATIO GATES,	CHARLES MORROW,
THOMAS WHITE,	JOHN MARK,
JOHN MORROW,	ROBERT STUBBS,
BENONI SWEARINGEN,	JOS. SWEARINGEN,
ABRAHAM SHEPHERD,	JOHN KEARSLEY.

December 14, 1787.

Berkeley County, Virginia. ff.

The above gentleman, who are all of good fame, subscribed the above certificate in my presence. Given under my hand, this 14th December, 1787.

CATO MOORE.

Berkeley County, Virginia. ff. *(No. 8.)*

This day came George Rootes, before me, one of the Justices of the peace for the county aforesaid, and made oath, that Mr. James Rumsey informed him, in the year 1784 that he was projecting a boat to work with steam, and the said George has heard, and verily believes, that the said Mr. Rumsey, from the time of his leaving the agency of the Potowmack company, has pursued his intention of perfecting his steam engine for that purpose with unremitted attention, which the said George is informed is now in great forwardness.

Given under my hand, this 24th day of November, 1787.

WILLIAM LITTLE.

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Berkeley County, Virginia ff. *(No. 9.)*

This day came CHARLES MORROW, before me, one of the Justices of the Peace for the said county, and made oath, that in the beginning of the year 1785, Mr. JAMES RUMSEY told him, that by making use of steam he could raise WATER for MILLS, and that he would do it as soon as he had completed his steam boat.

CHARLES MORROW.

Sworn to, and subscribed before me, this 13th of December, 1787.

JOHN KEARSLEY.

Berkeley County, Virginia ff. *(No. 10.)*

This day came Nicholas Orrick, before me, one of the Justices of the Peace for the county aforesaid, and made oath, that Mr. James Rumsey informed him, in the year 1784, that he was projecting a boat to work with steam, and that he the said Nicholas doth know that the said Mr. Rumsey from that time has pursued his intention of perfecting his steam engine for that purpose, and that the said Nicholas has been on board of the said Rumsey's boat, when going by the power of steam, and has reason to believe it may answer a valuable purpose when completed. Given under my hand, this 24th day of November, 1787.

WILLIAM LITTLE.

Berkeley County, Virginia ff. *(No. 11.)*

This day came Charles Morrow, before me, one of the Justices of the Peace for the aforesaid county, and made oath, that in the course of the summer 1785, Mr. James Rumsey had a boat built near the town of Bath, that early in the fall he had her brought down the river to Shepherds-Town, and shortly after Mr. Joseph Barns was sent to Baltimore, in order to have some machinery cast; that he then understood the boat was to be propelled by steam; that shortly after Mr. Barns returned from Baltimore he was sent to Frederick-Town, in order to have some other things made, agreeable to Mr. Rumsey's directions, and thinks

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he returned from thence about the middle of November; that the said Charles then saw the machinery Mr. Barns had got made, viz. a boiler, two cylinders, pumps, pipes, &c. That about the first of December it appeared to the said Charles, that the whole of the machinery was ready to be fixed to the boat, which came down to the Falls of Shanandoah for experiment, but the ice then commencing prevented it for the winter. That in the winter Mr. Rumsey told him he had made sundry improvements; in particular, that he had invented an entirely new constructed boiler; that the said Rumsey sent to a forge for iron, and set two smiths to work, with directions how to make it; but when it was ready to be put together, he found, upon examination, the workmanship was so badly executed that it would not answer the purpose; he therefore concluded to try an experiment with his old boiler; and the said Charles says, that Mr. Barns (Mr. Rumsey's principal mechanic) continued during the winter to execute the different improvements Mr. Rumsey had made; in the spring, 1786, the machinery was put on the boat, and the first trial made, the said Charles being on board; that she went against the current until the steam escaped, by the then imperfectness of the machine. Upon an experiment made with the new boiler, the heat of the steam was so greatly increased, that it dissolved the soft solder, which had been thought, and before had proved, sufficient for cementing the sundry parts of such machines; and as hard solder was obliged to be used in the repairs, delays were necessarily created. July 1787. Mr. Rumsey had his new-constructed boiler repaired, which he, the said Charles, conceives to be the most capital contrivance to make steam that can be invented, for when the machine is not at work, the whistling of the steam may be heard at least half a mile; and he is convinced that it does not hold more than three gallons of water; and the said Charles further saith, that Mr. Rumsey has for several years steadily pursued his boat scheme, to the total neglect of every other kind of business, which has very considerably injured his circumstances, having Mr. Barns employed at five pound per month; since the year eighty-five; and that he conceives the boat to be now near her completion: And the said

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Charles has not a doubt but Mr. Rumsey is equal to the task of making her perform according to the original position.

CHARLES MORROW.

Sworn to, and subscribed before me, December 8th 1787.

JOHN KEARSLEY.

Berkeley County Virginia. ff. *(No. 12.)*

This day came Joseph Barns before me one of the Justices of the Peace for the said county, and made oath, that he was employed by Mr. James Rumsey, in May, 1785, to build a boat on Potowmack river, near the town of Bath, and that he was then informed by the said Rumsey, that the boat, when finished, was to be propelled by steam, and that he had built the boat. Soon after (he thinks in September) he went, by the request of Mr. Rumsey, to Baltimore, to get some machinery cast for the boat; and in October and November, in Frederick town, he got all the other machinery made for an experiment by steam. In December it was put on the boat, at Shanandoah Falls, but before it could be got ready for trial, the ice began to drive, which prevented it: Also, that Mr. Rumsey, during the winter invented his new constructed boiler, and had it made ready to put together before the spring, but it was so badly executed, that he declined making the experiment with it, but proposed to try his old boiler: accordingly, in April, 1786, the experiment was made, and the boat went against the current of Potowmack; but many parts of the machine being imperfect, and some parts rendered useless by the heat of the steam, he was obliged to have it repaired, which was done at the Great Falls, and she was again tried, but failed in the repaired work, though it made many powerful strokes before it failed, and sent the boat forward with such power, that one man was not able to hold her. The next experiment was attempted in December, with the new constructed boiler, but the violence of the heat was so great, from the steam, that it melted the soft solder that great part of the machine was put together with, and rendered it entirely useless, until repaired with hard solder; about this time, the ice drifting, carried off the boat which the machinery was made for, and destroyed her in such a manner, that the

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repairing her was equal to one half of the expence of building a new one: That the boat was, in the Spring, 1787 repaired, the machine also, and was ready for trial in September, when the boat moved up the river, against the current, with about two tons on board, besides the machine, at the rate of two miles per hour; but the new boiler was so badly made, that it opened at several of its joints, which let great quantities of the steam escape: And the said Barns further saith, that to his knowledge, the machine at the last trial, on December 3, 1787, was very imperfect in many parts, as the same boiler was then made use of, after receiving some repairs: It is his opinion it may be brought to answer very valuable purposes, as it will be simple, cheap, light and durable, and may be applied to a ship of the largest size to advantage, having no external application whatever. And the said Barns further saith, that Mr. Rumsey has, to his knowledge, injured his circumstances very much, by quitting all kinds of business to pursue the boat; that he the said Barns, has received of the said Mr. Rumsey five pounds per month besides his board, from April, 1785, to the present time; which, in his opinion, is but a small part of the expences the said Mr. Rumsey must have been at in the prosecuting his plan. His new constructed boiler must exceed every thing of that kind yet extant, as it will not hold more than twenty pints, and, in his opinion, will make more steam than a five hundred gallon boiler in the common way: and from the observation he has made, has reason to believe, that six bushels of good coals will serve it for twelve hours. The weight of the present machine is about seven hundred pound, and will not occupy more space than four flour barrels.

Sworn before me, this 10th December, 1787.

CATO MOORE.

(No. 13.)

A PARAGRAPH from GENERAL WASHINGTON's Lette in answer to mine of the 10th of March 1785.

"It gives me much pleasure to find by your letter, that you are not less sanguine in your boat project than when I saw you in Richmond, and that you have made such further discoveries as will render them more extensively useful than was at first expected, you have my best wishes for the success of your plan."

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(No. 14.)

ANNAPOLIS, December 18, 1787.

SIR,

In compliance with your request I mention the principal facts and circumstances with which I am acquainted respecting your Steam Engine, and your expectation of its effect in boat navigation. I was entirely ignorant of the principle on which you were to gain your power, and your manner of applying it, till our return from the Great Falls together, in October or November (but I think October) 1785, when you told me that you relied on steam for your first power, and wished me to promote your having cylinders cast at my brother's and my works; the attempt did not succeed—I considered myself under an obligation to secrecy till in the progress of making copper cylinders in Frederick-Town some time after, when I found, that the designed purpose of the cylinder was a subject of pretty general conversation.

Being on the committee appointed to consider and report on Mr. Fitch's petition, I thought it my duty to mention what was in my memory, of your telling me that you had communicated your principle to General Washington, as I thought, tho' perhaps mistakenly, at the time your model and experiment were exhibited before the General; and with the approbation of the committee, wrote to the General on the subject: his answer now before me, is to this effect, that "at that time, September, 1784, nothing was intimated of steam: that the November following, in Richmond, you spoke to him of the effect of steam, and of the conviction you were under of the usefulness of its application for the purpose of inland navigation," but the General seems to have thought it an immatured idea, that he did not then imagine you relied on.

Mr. Fitch having oftened mentioned the time (I think April, 1785,) when the idea first struck him, and yours being prior, the committee could not report in favor of Mr. Fitch, the Gen. added in his answer," It is proper for me herewith to add, that some time after this Mr. Fitch called on me, in his way to Richmond, and explaining his scheme, wanted a letter from me introductory to the Assembly of this (Virginia) state, the giving of which I de-

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clined, and went so far as to inform him, that though I was enjoined not to disclose the principles of Mr. Rumsey's discovery, yet, I would venture to assure him, that the thought of applying steam was not original, but had been mentioned to me by Mr. Rumsey."

I esteem myself no ways competent to decide on philosophical or mechanical principles, but if you can simplify the steam engine, render it cheap, and apply its powers to raise water in great quantities, for the purposes of agriculture and water-works of all kinds, or apply the powers more immediately, as has been much the subject of conversation between us at times, every man may easily perceive a vast field of improvement will thereby be opened, which I most sincerely wish you may largely reap the good fruits of,

I am, Sir, your most obedient servant,

THOMAS JOHNSON.

Berkeley County, Virginia. ff. *(No. 15.)*

This day came Michael Bedinger, before me, one of the Justices of the Peace for the said county, and made oath, that Mr. James Rumsey informed him, in, or before the month of March, 1784, that he was of opinion that a boat might be constructed to work by steam, and that he intended to give it a trial, and mentioned some of the machinery that would be necessary to reduce it to practice: and the said Michael further saith, that he set out for Kentucky, immediately after, in order to survey some lands, and resided there upwards of eighteen months, and that during the time of his stay there, he frequently mentioned Mr. Rumsey's boat scheme: He believes that he also mentioned, that it was to be wrought by steam.

The above was voluntarily sworn before me, by Capt. Bedinger, who is a gentleman of reputation.

November 28, 1787. JOHN KEARSLEY.

We whose names are hereunto subscribed, certify, that the within mentioned Michael Bedinger is a gentleman of reputation and veracity.

HORATIO GATES,
THOMAS WHITE,
JAMES KERNEY,
JOHN MORROW,
JOSEPH MITCHEL.
CHARLES MORROW,
JOHN MARK,
PHILLIP PENDLETON,
ROBERT STUBBS.

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(No. 18.)

The underwritten is a paragraph of a letter from a Mr. Daniel Buckley, living near Philadelphia, to a gentleman of Berkeley county, Virginia, and "Dr. M'Mechen," whom Mr. Buckley is so concerned for, is a partner with Mr. Rumsey in his steam boat. 'Tis copied and annexed, to prove how busy Mr. Fitch has been in calumny, and how easily he found credit and propagators. Should he incline to assert hereafter, what credit he will deserve has been so clearly proved, that future impositions may be avoided; and those who spread a slander they do not believe, deserve the contempt of all honest men.

"Please to give my sincere respects to Doctor M'Mechen and his worthy lady—he is my most particular acquaintance, and truly I am sorry he has been deluded by a person, who I have reason to believe is a deceiver, as Mr. Fitch, of Philadelphia, says, Mr. Rumsey got what small knowledge he has of steam from him, but he retained the essentials, without which, he says Mr. Rumsey cannot succeed."

We do certify that the above paragraph was taken from the aforesaid letter, and copied in our presence.

CHARLES MORROW, GEORGE ROOTES.

POSTCRIPT.

IT was not my intention, at this time, to present to the Public a description of some improvements I have made upon the construction of Water Mills of several kinds; and would not have introduced the small sketch given here, of some part of such plans which I now have, and hereafter may propose and exhibit to the world, but as I find by experience, that there is danger of being supplanted or undermined in any useful and profitable discovery, where the inventor cannot preserve to himself, the plan entirely until he has brought it to that perfection which would authorise his producing it to the Public and claiming the reward they might consider his invention merited; I therefore, from the solicitations and advice of several friends, have ventured to drop the following hints relative to some of them.

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On considering the common method of applying water to work mills of every sort, or any other machines, I have found that there is but a very small part of the power applied, inadequate greatly to what might be had, from the quantity of water expended, especially for undershot wheels; I therefore endeavored, by a practicable examination, to find whether a method might not be discovered to remedy the defect, so as to apply the power of water in a more effectual and advantageous manner.

On investigation of Doctor Barker's thoughts on a new invented mill, that if a few difficulties (which appeared insuperable in his plan) could be removed, it would be the most powerful method of directing water to turn mills, or any other machinery (where circumvolution is required) that has been yet discovered or made use of. These apparent difficulties I have been happy enough to find out effectual means to obviate, by an application of the water, on nearly the same principles as those suggested by the Doctor, though more simple and less expensive. The utility of these propositions I have proved by experiments, whence I found, that a fourth part of the expended water, and a tenth part of the expense usually accrued, will pay the cost, and answer every purpose of all the work or mechanism, at present made use of, for grist mills. &c.

With regard to a Saw-Mill, or any other machines that have retrograde movements, I have contrived a method of supplying them with water, in such a manner, that one twentieth part of what is generally expended, will answer every intent and purpose requisite.—My new invented Machine for raising Water, is simple; the cost will not be more than twenty guineas, to complete the mechanism of one sufficiently large to raise water to work six saws, or turn a grist-mill. Models of these machines I have, and purpose taking them with me to the next meetings of the different Assemblies, to whom I mean to apply, for encouragement, and at the same time convince them of the truth and utility of my proposals.

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(*No.* 19)

The following is part of a letter, wrote by the editor, to his Excellency General Washington, dated the 10th of March, 1785.

After mentioning that kind of machine for propelling boats which the General had seen a model of, I proceed to say—" I have taken the greatest pains to perfect another kind of boat, *upon the principles I mentioned to you at Richmond*, in November last, and have the pleasure to inform you that I have brought it to great perfection; it is true, it will cost something more than the other way, but, when in use, will be more manageable, and can be worked with as few hands; the power is immense—and I have quite convinced myself that boats of passage may be made to go against the current of the *Mississippi* or *Ohio* rivers, or in the *Gulf Stream* (from the *Leeward* to the *Windward-Islands*) from sixty to one hundred miles per day. I know this will appear strange and improbable to many persons, yet I am very certain it may be performed, besides, it is simple (when understood) and is also strictly philosophical.

The principles of this boat I am very cautious not to explain, as it would be easily executed by an ingenious person.

The plan I mean to pursue, is to put both the machines on board of boats * built on a large scale, and then, Sir, if you would be kind enough to see them make actual performances, I should not doubt but the assemblies would allow me something handsome, which would be more advantageous to the public than to give me the exclusive right of using them.

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* There were two boats connected, in the model I exhibited at Bath in September 1784. which is the reason I speak of boats in the plural, as experiment had convinced me that a single boat would not succeed on that principle.

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